

AMEND THE ABOVE-IDENTIFIED APPLICATION AS FOLLOWS:

In The Claims:

Amend claims 284, 331, 332, 337 and 348 as follows:

284. (Thrice Amended) A process for detecting a nucleic acid of interest in a sample, which process comprises the steps of:

(a) hybridizing said nucleic acid of interest in the sample with an oligo- or polynucleotide comprising at least one nucleotide selected from the group consisting of:

(i) a nucleotide having the formula

PM—SM—BASE—Sig

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety,

wherein PM is attached at the 3' or the 5' position of the [sugar]
monosaccharide moiety SM when said nucleotide is a
deoxyribonucleotide and at the 2', 3' or 5' position when said
nucleotide is a ribonucleotide, BASE is attached to the 1' position of
SM from the N¹ position when BASE is a pyrimidine or the N⁹ position
when BASE is a purine or a 7-deazapurine, and Sig is covalently
attached to BASE at a position other than the C⁵ position when BASE
is a pyrimidine, at a position other than the C⁸ position when BASE is a
purine and at a position other than the C⁷ position when BASE is a
7-deazapurine and such covalent attachment does not substantially
interfere with double helix formation;

Dean L. Engelhardt, et al.
Serial No.: 08/486,069

Filed: June 7, 1995

Page 3 (Supplemental Response to Applicants' July 6, 1998 Amendment
Under 37 C.F.R. § 1.116 – July 24, 1998)

- (ii) a nucleotide having the formula

Sig
|
PM—SM—BASE

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety,

wherein PM is a phosphate moiety, SM is a [ribose or deoxyribose sugar] monosaccharide moiety, and BASE is a pyrimidine, purine or 7-deazapurine moiety, said PM being attached to SM at a position independently selected from the 2', 3', and 5' positions of SM when said nucleotide is a ribonucleotide, and at a position independently selected from the 3' and 5' positions when said nucleotide is a deoxyribonucleotide, said BASE being attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is a purine or 7-deazapurine, and Sig is covalently attached to SM directly or through a linkage group and such covalent attachment does not substantially interfere with double helix formation; and

- (iii) a nucleotide having the formula

Sig—PM—SM—BASE

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety,

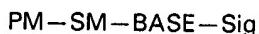
*✓ Cofed ✓
Sub K1*

wherein PM is attached to the 3' or the 5' position of SM when said nucleotide is a deoxyribonucleotide and at the 2', 3' or 5' position when said nucleotide is a ribonucleotide, BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is a purine, and Sig is covalently attached to PM and such covalent attachment does not substantially interfere with double helix formation; and

- Sub K1*
- (b) detecting the presence of said detectable Sig moieties in any of the oligo- or polynucleotides which have hybridized to said nucleic acid of interest.

331. (Amended) The process according to claim 329, wherein said modified nucleotide comprises a member selected from the group consisting of:

- (i) a nucleotide having the formula



wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine 7-deazapurine, and

Sig is a detectable moiety,

wherein PM is attached at the 3' or the 5' position of the [sugar] monosaccharide moiety SM when said nucleotide is a deoxyribonucleotide and at the 2', 3' or 5' position when said nucleotide is a ribonucleotide, BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is a purine or a 7-deazapurine, and Sig is covalently attached to BASE at a position other than the C⁵ position when BASE is a pyrimidine, at a position other than the C⁸ position when BASE is a purine, and at a position other than the C⁷ position when BASE is a 7-deazapurine and such covalent attachment does not substantially interfere with double helix formation;

✓ Sub K3

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Serial No.: 08/486,069
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Page 5 (Supplemental Response to Applicants' July 6, 1998 Amendment
Under 37 C.F.R. § 1.116 – July 24, 1998)

(ii) a nucleotide having the formula

Sig

|
PM—SM—BASE

wherein

Gabe
K3
JW
CM

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety,

said PM being attached to SM at a position independently selected from the 2', 3', and 5' positions of SM when said nucleotide is a ribonucleotide, and at a position independently selected from the 3' and 5' positions when said nucleotide is a deoxyribonucleotide, said BASE being attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is a purine or 7-deazapurine, and Sig is covalently attached SM directly or through a linkage group and such covalent attachment does not substantially interfere with double helix formation; and

(iii) a nucleotide having the formula

Sig—PM—SM—BASE

wherein

PM is a phosphate moiety,

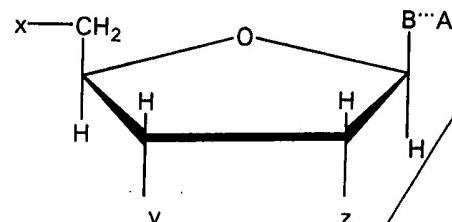
SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is detectable moiety,

wherein PM is attached to the 3' or the 5' position of SM when said nucleotide is a deoxyribonucleotide and at the 2', 3' or 5' position when said nucleotide is a ribonucleotide, BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is purine, and Sig is covalently attached to PM and such covalent attachment does not substantially interfere with double helix formation.

332. (Amended) The process according to claim 329, wherein said modified nucleotide has the structure:



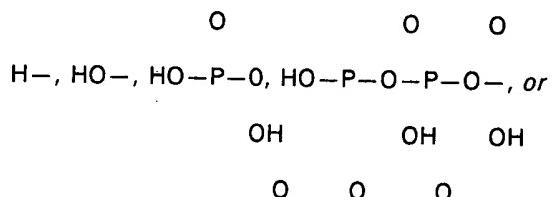
wherein B represents a purine, a 7-deazapurine or a pyrimidine [moeity] moiety suitable for incorporation into a polynucleotide and covalently bonded to the C¹-position of the [sugar] monosaccharide moiety, provided that when B is a purine or 7-deazapurine, the [sugar] monosaccharide moiety is attached at the N⁹ position of the purine or deazapurine, and when B is a pyrimidine, the [sugar] monosaccharide moiety is attached at the N¹ position of the pyrimidine;

wherein A represents at least three carbon atoms and is an indicator molecule that is self-signaling or self-indicating or self-detecting selected;

wherein B and A are covalently attached directly or through a linkage group, said linkage group not interfering substantially with detection of A;

wherein if B is a purine, A is attached to the 8-position of the purine, if B is a 7-deazapurine, A is attached to the 7-position of the deazapurine, and if B is a [pyrimidien] pyrimidine, A is attached to the 5-position of the pyrimidine; and

[wherein each of x, y and z represents:

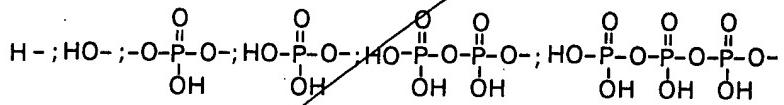


*Sub
K3
J2
Concl*

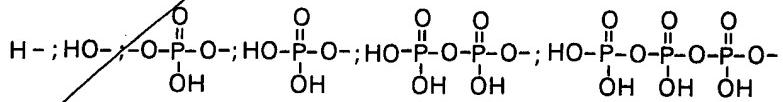


$\text{OH} \quad \text{OH} \quad \text{OH}]$

wherein x comprises a member selected from the group consisting of:



wherein y comprises a member selected from the group consisting of:



wherein z comprises a member selected from the group consisting of

H- and HO-.

*Sub
K5
J3*

337. (Twice Amended) A process for preparing a labeled oligo- or polynucleotide of interest, comprising the steps of:

(A) providing:

one or more chemically modified nucleotides capable of incorporating into an oligo- or polynucleotide, alone or in conjunction with one or more other modified or unmodified nucleic acids selected from the group consisting of nucleotides, oligonucleotides and polynucleotides, said other modified or unmodified nucleic acids being capable of incorporating into an oligo- or polynucleotide, said chemical modification comprising a label capable of providing directly or indirectly a detectable signal indicating the presence of said labeled oligo- or polynucleotide, said chemically modified nucleotides being modified on the sugar, phosphate or base moieties thereof and being selected from the group consisting of:

(i)

PM – SM – BASE – Sig

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety, and

wherein PM is attached at the 3' or the 5' position of the [sugar]
monosaccharide moiety SM when said nucleotide is a
deoxyribonucleotide and at the 2', 3' or 5' position when said
nucleotide is a ribonucleotide, BASE is attached to the 1' position of
SM from the N¹ position when BASE is a pyrimidine or the N⁹ position
when BASE is a purine or a 7-deazapurine, and Sig is covalently
attached to BASE directly or through a linkage group at a position
other than the C⁵ position when BASE is a pyrimidine, at a position
other than the C⁸ position when BASE is a purine, and at a position
other than the C⁷ position when BASE is a 7-deazapurine and such
covalent attachment does not substantially interfere with double helix
formation;

(ii)

Sig

|

PM—SM—BASE

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety, and

wherein said PM is attached to SM at a position independently
selected from the 2', 3', and 5' positions of SM when said nucleotide
is a ribonucleotide, and at a position independently selected from the
3' and 5' positions when said nucleotide is a deoxyribonucleotide,
said BASE is attached to the 1' position of SM from the N¹ position
when BASE is a pyrimidine or the N⁹ position when BASE is a purine
or 7-deazapurine, and Sig is covalently attached to SM directly or
through a linkage group and such covalent attachment does not
substantially interfere with double helix formation; and

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Cont
(iii)

Sig-PM-SM-BASE

wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is detectable moiety; and

wherein PM is attached to the 3' or the 5' position of SM when said nucleotide is a deoxyribonucleotide and at the 2', 3' or 5' position when said nucleotide is a ribonucleotide, BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is purine, and Sig is covalently attached to PM directly or through a linkage group and such covalent attachment does not substantially interfere with double helix formation; and

said oligo- or polynucleotide of interest; and

(B) incorporating said one or more modified nucleotides into said oligo- or polynucleotide, thereby preparing a labeled oligo- or polynucleotide of interest.

Sub K6
348. (Twice Amended) A process for detecting the presence of an oligo- or polynucleotide of interest in a sequencing gel, comprising the steps of:

(A) providing:

(a) one or more chemically modified nucleotides capable of incorporating into an oligo- or polynucleotide, alone or in conjunction with one or more other modified or unmodified nucleic acids selected from the group consisting of nucleotides, oligonucleotides and polynucleotides, said other modified or unmodified nucleic acids being capable of incorporating into an oligo- or polynucleotide, said chemical modification rendering said one or more chemically modified nucleotides either:

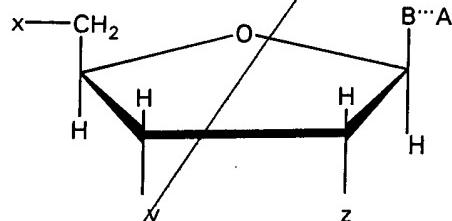
(I) self-signaling or self-indicating or self-detecting; or

(II) comprising a label capable of providing directly or indirectly a detectable signal;

said self-signaling or self-indicating or self-detecting chemical modification or said label indicating the presence of said labeled oligo- or polynucleotide; thereby indicating the presence of said labeled oligo- or polynucleotide, said chemically modified nucleotides being modified non-disruptively or disruptively on at least one of the sugar, phosphate or base moieties thereof; and

- Sub K*
cont
- (b) an oligo- or polynucleotide;
(B) incorporating said one or more chemically modified nucleotides into said oligo- or polynucleotide, thereby preparing a labeled oligo- or polynucleotide of interest, said labeled oligo- or polynucleotide of interest comprising one or more chemically modified nucleotides selected from the group consisting of:

(i)

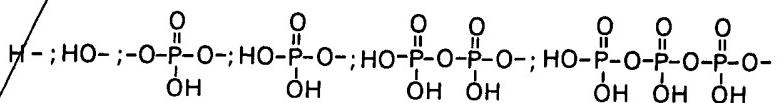


wherein B represents a purine, a 7-deazapurine or a pyrimidine moiety covalently bonded to the C1'-position of the sugar moiety, provided that whenever B is a purine or 7-deazapurine, the sugar moiety is attached at the N9-position of the purine or 7-deazapurine, and whenever B is a pyrimidine, the sugar moiety is attached at the N1-position of the pyrimidine;

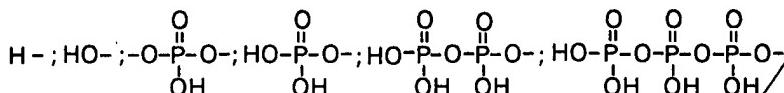
wherein A comprises at least three carbon atoms and represents at least one component of a signalling moiety capable of producing directly or indirectly a detectable signal or being self-signaling or self-indicating or self-detecting; and

wherein B and A are covalently attached directly or through a linkage group; and

wherein x comprises a member selected from the group consisting of:

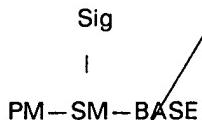


wherein y comprises a member selected from the group consisting of:



wherein z comprises a member selected from the group consisting of
H- and HO- ;

(ii)



wherein

PM is a phosphate moiety,

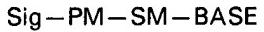
SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is a detectable moiety, and

wherein said PM is attached to SM at a position independently selected from the 2', 3', and 5' positions of SM when said nucleotide is a ribonucleotide, and at a position independently selected from the 3' and 5' positions when said nucleotide is a deoxyribonucleotide, said BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when BASE is a purine or 7-deazapurine, and Sig is covalently attached to SM directly or through a linkage group; and

(iii)



wherein

PM is a phosphate moiety,

SM is a [sugar] monosaccharide moiety,

BASE is a pyrimidine, purine or 7-deazapurine, and

Sig is detectable moiety; and

wherein PM is attached to the 3' or the 5' position of SM when said nucleotide is a deoxyribonucleotide and at the 2', 3' or 5' position when said nucleotide is a ribonucleotide, BASE is attached to the 1' position of SM from the N¹ position when BASE is a pyrimidine or the N⁹ position when

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Serial No.: 08/486,069

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Page 12 (Supplemental Response to Applicants' July 6, 1998 Amendment
Under 37 C.F.R. § 1.116 – July 24, 1998)

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BASE is purine, and Sig is covalently attached to PM directly or through a linkage group;

- (C) transferring said labeled oligo- or polynucleotide of interest to a sequencing gel;
- (D) separating said labeled oligo- or polynucleotide of interest from other nucleic acids not of interest; and
- (E) detecting directly or indirectly the presence of said labeled oligo- or polynucleotide.

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